

RTCA Special Committee 186, Working Group 3

ADS-B 1090 MOPS, Revision A

Meeting #16

Test for Sliding Window Decoding

Presented by William Harman

SUMMARY

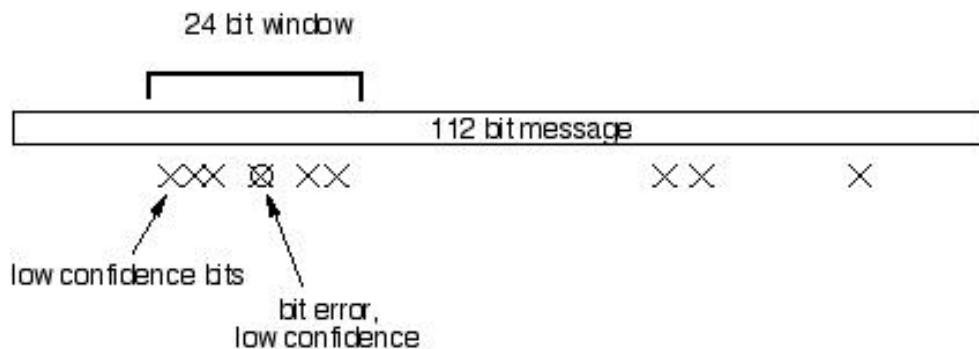
Section 2.2 includes a requirement that in classes A1, A2, and A3, error correction techniques must not employ the Sliding-Window technique, which is used in TCAS. A corresponding test in section 2.4 was drafted and discussed at the previous meeting. Subsequent discussions with experts have indicated a need to revise this test, to allow for detailed difference in reception techniques. This paper presents a revised test procedure.

Test for Sliding Window Decoding

Although the Sliding-Window technique for error correction is used in TCAS receivers, the MOPS requires that this technique not be used for ADS-B classes A1, A2, and A3. Relative to TCAS, these ADS-B receivers have enhanced sensitivity and use enhanced reception techniques, including a different form of error correction. Under those conditions, the Sliding-Window technique is not appropriate because it produces a relatively high rate of undetected errors.

Therefore, the MOPS requires in section 2.2 that the Sliding-Window technique not be used in those classes. The corresponding test in section 2.4 was drafted and discussed at the previous WG-3 meeting. Following the meeting, I had an action item to discuss this test with Jeff Gertz and John Van Dongen to make sure that it would be effective.

In these post-meeting discussions, we realized that the test as drafted would not be appropriate for some receiver designs. The difficulty is in specifying a particular test condition that will induce bit errors and low confidence bit flags. To solve this problem, John Van Dongen and Tom Pagano developed a concept in which the test explicitly states the number of bit error and low confidence flags (illustrated below), but does not explicitly state the test conditions that will induce these bit errors and low confidence flags. Those specifics are implementation dependent.



The proposed revision to the test procedure is as follows.

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Purpose/Introduction:

This test verifies that the sliding window error correction technique, which is used in TCAS, is not being used in the unit under test. [In lieu of this test procedure, an](#)

[analysis of the hardware/software design may be performed showing that a sliding window error correction technique is not used.](#)

To carry out this test, it is necessary to introduce several low-confidence flags for which the corresponding information bit is incorrect in some case and in other cases low-confidence flags for which the corresponding bit is correct. Introducing such errors and flags may be done in different ways for different receiver designs. Given that the implementation specifics for enhanced reception are not rigidly standardized (whereas the reception performance is standardized), the specific means for introducing the bit errors and flags is implementation dependent.

Equipment Required:

Provide a method of supplying the UUT with any valid ADS-B Message having:

"DF"	=	17
"CA"	=	0
"AA"	=	any discrete address
Message rate	=	1 Hz
Frequency	=	1090 MHz
Power	=	-50 dBm

Also provide an interference generator that can generate multiple interference pulses, in order to introduce bit errors and low-confidence flags.

Measurement Procedure:

Step 1: Verification of Operation of Equipment Under Test

Apply the ADS-B Input Message without interference. [Verify that there is at least 99% correct reception. Normally message acceptance is reliable under this condition.](#)

Step 2: Test with low-confidence flags

Add interfering pulses in a way that introduces six (6) low-confidence flags within a 24 microsecond window and three (3) additional low-confidence flags away from the 24 microsecond window. [The 24 microsecond window begins with the first low-confidence flag.](#) For the six affected bits in 24 microseconds, one is to have a bit error, and the other five are to have correct bit declaration. For the three bits away from the 24 microsecond window, all three are to have correct bit declaration. Verify that the message is not accepted under this condition.